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IN THE

SUPREME COURT OF THE UNITED STATES

October Term, ~~1968~~ 1969

No. [redacted] 259

SVENSKA AEROPLAN AKTIEBOLAGET (SAAB),
Plaintiff-Petitioner

vs.

MERGENTHALER LINOTYPE COMPANY,
Defendant-Respondent

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

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Petitioner, Svenska Aeroplan Aktiebolaget, now by change of name Saab Aktiebolag, prays that a Writ of Certiorari issue to review the judgment of the United States Court of Appeals for the Second Circuit, entered in the above-entitled cause on March 24, 1969.

OPINIONS BELOW

The opinion of the United States District Court for the Eastern District of New York, delivered orally from the bench at the conclusion of the trial, is not reported. It is printed at p. A-1 to A-10 of the appendix hereto.

The opinion of the Court of Appeals, reported at — F. (2d) —, 161 U.S.P.Q. 257, is printed in the appendix at p. A-18 to A-27.

JURISDICTION

The judgment of the Court of Appeals for the Second Circuit was entered March 24, 1969. A timely petition for rehearing was ordered denied on April 14, 1969.

The jurisdiction of this Court is invoked under 28 U.S.C., 1254(1).

QUESTIONS PRESENTED FOR REVIEW

1. What determines the range of equivalents to be accorded to a patent claim drafted in accordance with the third sentence of 35 U.S.C., 112, which provides that a claim recitation of "a means * * * for performing a specified function" shall be construed to cover the corresponding structure disclosed in the specification "and equivalents thereof"?

(a) In determining that range of equivalents, should the starting point be the most pertinent prior art, and should the claim then be accorded a broad range of equivalents where an accused infringer in a plenary patent suit can adduce *no* pertinent prior art against it?

(b) Or, should the starting point be a consideration of the differences between an accused device and the particular embodiment of the invention disclosed in the patent?

2. Under what circumstances — if any — should patent claims drafted in the "means" plus statement-of-

function format permitted by 35 U.S.C., 112 be limited to no more than what is disclosed in the specification of the patent?

3. Was the third sentence of 35 U.S.C., 112 intended to abrogate the rule of *Halliburton Oil Well Cementing Co. v. Walker,* 329 U.S. 1, 67 S. Ct. 6 and restore the doctrine of *Westinghouse v. Boyden Power Brake Co.,* 170 U.S. 537, 18 S.Ct. 707; or was it intended to be consistent with *Halliburton* and to codify the judicial rules of claim interpretation that were established prior to its enactment?

STATUTES INVOLVED

The statutory provisions involved are:

35 U.S.C., 112. *Specification*

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
>
> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claims shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C., 271. *Infringement of Patent*

(a) Except as otherwise provided in this title, whoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent.

* * *

STATEMENT OF THE CASE

This is a patent infringement action brought under 28 U.S.C., 1338 by Saab against Mergenthaler, charging Mergenthaler with infringement of Saab's Wilkenson et al patent No. 2,609,729, on account of Mergenthaler's manufacture and sale of toss bombing instruments designated M-2. Mergenthaler sold the accused M-2 devices only to entities other than the United States Government. (The Government has a license under the patent under which were made numerous royalty-paid instruments (36a) that were somewhat different from the M-2.)

As defenses to the action Mergenthaler pleaded (12a) both noninfringement and invalidity, citing eleven prior patents (15a-16a) on the invalidity defense. At trial Saab presented a substantial amount of testimony concerning all of the pleaded prior art, bringing out the radically inventive character of the advance covered by the patent in suit (48a-49a, 57a, 58a, 66a-67a, 98a-99a, 195a-198a, 262a-265a, 276a-279a, 287a). Mergenthaler's evidence comprised mere mention of the title of one of the pleaded prior patents (396a-397a) and an admission on cross-examination (405a) that the structure disclosed by that reference was "very substantially different" from that of the patent in suit.

On the issue of infringement it was conceded by defendant's only witness that the claims in suit read in terms

upon the M-2 (390a-396a), and the trial court found that the M-2 functions in substantially the same manner as the patented instrument to achieve the same result (431a, A-9; 438a, A-16).

At the conclusion of the trial the district judge orally delivered his opinion (A-1—A-10)[1] holding the patent valid but not infringed. He made no specific reference to the language of the patent claims as the basis for holding noninfringement. Instead he compared the M-2 with the illustrative embodiments of the invention disclosed in the patent and with certain technical information that Saab had revealed to Mergenthaler during a relationship between the parties prior to Mergenthaler's design of the M-2. He found that the M-2 did not embody a simplification which the patentees disclosed in their patent as preferable for certain embodiments of their invention but which the patent claims did not recite as essential to the invention; and he further found that the M-2 embodied certain improvements to the illustrative instruments disclosed in the patent. Those findings were the basis of his holding of noninfringement.

The district court's findings of fact and conclusions of law (A-11—A-17) are substantially a digest version of its opinion.

The Court of Appeals affirmed the holding of noninfringement and found no occasion to consider the ques-

[1]References prefixed by "A-" are to the pages of the Appendix to this Petition, containing the opinions of the courts below and the district court's findings of fact and conclusions of law.

tion of validity[1] which Mergenthaler raised by a cross-appeal (A-18—A-27).

The invention of the patent in suit is a computing instrument for aerial bombing that obsoleted the tactics of level bombing and dive bombing that were well known to the public through their extensive use in World War II (62a, 303a, 313a-314a). The bombing mode made possible by the instrument of the patent had no recognized name at the time the patent was applied for. The patent speaks of it as dive bombing with release in the pullout (466a, col. 4, lines 2-6), but in the art it has come to be known as toss bombing. Although this new bombing mode has received little publicity, the patented instrument that makes it possible has been adopted by most of the air forces of the free world.

In the old level bombing tactic, as practiced with such instruments as the famous Sperry and Norden sights of World War II, a bombardier observed the target through an optical sight that defined an axis which was inclined generally downwardly and forwardly relative to the airplane flight path, while the pilot flew the airplane at constant speed and altitude (47a-49a). As the airplane moved in its bombing run, a motor in the instrument swung the sight to keep its axis aligned on the target. The bombardier, by manipulation of knobs and by signals to the pilot, controlled the rate of swing of the sight axis to synchronize it with the speed of the airplane and

[1]That the cross-appeal was without substance is apparent from the statement in the opinion of the Court of Appeals (A-18—A-19): "In its cross-appeal, Mergenthaler contends that by application of the doctrine of file wrapper estoppel, the District Court should have found the Saab patent invalid." The doctrine of file wrapper estoppel holds that the claims of a patent can not be accorded a scope equivalent to that of claims which the patentee gave up during prosecution of the application. *Exhibit Supply Co. v. Ace Patents Corporation*, 315 U.S. 126, 62 S.Ct. 513 (1942). File wrapper estoppel cannot affect validity.

corrected the airplane flight path to compensate for side drift due to wind. The instrument automatically issued a release impulse to the bomb racks when the sight axis had swung to a predetermined angle that depended on such factors as the speed and the altitude of the airplane (47a).

Prior dive bombing used a sight along which the pilot could view the target and which was depressed downwardly and forwardly relative to the longitudinal axis of the aircraft. Putting his airplane into a steep dive from a prescribed initial altitude, the pilot had to align the sight on the target and maneuver his airplane to keep it so aligned, until he reached a prescribed low altitude at which he pushed a button to effect bomb release (52a-54a, 60a). The inclination of the dive bombing sight axis was necessary because an airplane does not make a truly vertical dive. After release the bomb therefore followed a downwardly and forwardly curving trajectory, and the inclination of the sight axis compensated for the curvature of its path.

In both prior level bombing and prior dive bombing the attacking aircraft had to maintain a substantially straight flight path for an extended period, during which defending forces could predict its course (47a, 48a-49a; 56a-57a, 295a). For both, airmen had to acquire specialized skills in a high degree. Level bombing demanded close coordination between bombardier and pilot; dive bombing required the pilot to achieve high precision under circumstances that made it difficult for him to maneuver his aircraft, with the use of a sight that could not be aimed in a natural manner because of its downward inclination relative to the aircraft flight path (55a, 292a-296a).

The instrument of the patented invention is used with a sight that is fixed in the aircraft and defines an axis substantially parallel to the aircraft's longitudinal axis. Therefore the sight can be aimed in a natural manner: it points where the nose of the aircraft points (55a-56a, 63a).

In using the instrument, the pilot can start from any of a wide range of altitudes and distances from the target (62a-64a, 298a). He enters a dive toward the target, and the instant he is satisfied that the sight is aligned on the target, he pushes a so-called pickle switch. Then he can begin a pullout from the dive. The rate of pullout is discretionary with the pilot but naturally tends to be as steep as he can sustain (307a-308a, 410a). The only limitation on the pullout is that it be wings-level, straight forward.

During the pullout the instrument makes a continuous computation which eventuates in the issuance of a bomb release impulse at the precise instant during the pullout that will send the bomb on a trajectory to the target (64a, 72a-74a).

The invention not only eliminates the need for highly specialized skills by allowing the pilot to aim in a natural manner, but it leaves him much less vulnerable to defending forces than prior bombing modes because it gives him much greater flexibility in planning his attack (298a) and requires him to fly a straight, easily predictable course for only the brief moment needed to assure himself that his sight is aligned on the target and "pickle," that is, press the pickle switch (72a).

During the trial the issue of infringement centered around only one element of the claims in suit. Mergenthaler effectively conceded that in all other respects the

claims found their full responses in the accused M-2 instrument. And as to that one element, moreover, Mergenthaler's witness conceded that it was present in the M-2 (395a-396a). But the courts below concurred in finding noninfringement on the basis that the M-2 includes something *more* than what the claims call for.

Specifically, the disclosure of the patent brings out that the instrument, in making its computation during the pullout from the aiming dive, should take account of the change that occurs between pickle and release in an angle known as the target angle (111a, 120a, 320a, 339a). The target angle is defined as the angle between the horizontal and a line connecting the aircraft with the target, and its change during the pullout is due to the horizontal component of the aircraft's motion (109a, 111a-112a, 114a-117a).

As a recommended simplification of the instrument, the patent discloses that there can be built into the instrument an assumed value of target angle change for each aiming dive angle (114a, 117a). The patent of course gives further and more particular information about how this is to be accomplished, but here it is sufficient to note that the patent recommends that the change in target angle during the pullout be taken into account on the basis of: the angle of the aiming dive, certain values that can be determined empirically from flight test data, and a simplifying assumption about the pullout flight path (117a-118a, 204a-205a).

It is to be emphasized that this recommended simplification is not of the essence of the invention; the claims are not limited to it because the invention was much broader and more basic, residing in the general instrument combination that makes the new bombing mode possible.

In that combination the simplification is an optional feature.

In reciting that portion of the instrument that takes account of target angle change during the pullout, the claims call for means for producing an ouput that is a function of the angle of the aiming dive at the instant of pickle, which angle is at that instant equal to the target angle.

In the matter of target angle change, as in all others, the M-2 follows the main teachings of the patent. It takes account of target angle change during pullout, and it confessedly employs for this purpose means for producing an output which is a function of the dive angle at pickle (395a-396a). But the M-2, instead of using the suggested simplification disclosed in the patent, includes in its computing instrumentalities some additional means by which it is enabled to make a running calculation of target angle change all through the pullout (142a, 202a, 339a-340a).

Mergenthaler did not take advantage of the simplification suggested in the patent because it wanted to make the M-2 capable of certain bombing modes in addition to the basic maneuver made possible by the use of the illustrative instruments disclosed in the patent (146a, 214a, 339a). Those additional bombing modes, while not taught by the patent, derive more or less directly from the invention of the patent and in effect stand on its shoulders. However, the M-2 is capable of — and is intended for — the basic maneuver performed with the patented instrument, and the courts below concurred in finding that when used in that basic maneuver, the M-2 performs the same functions as the patented instrument, with exactly the same results (A-9, A-16, A-25—A-26).

The only reference to the language of the claims in suit that can be found in the opinion of the trial court is the following (A-10):

> "To the extent that the claims of the patent in suit are valid and to the extent that they are supported by sufficient divulgence, there is no infringement by the M-2."

The qualification concerning "the extent that the claims of the patent in suit are valid" has no limiting significance, for there is no suggestion in the findings — or in the record — of any prior art being pertinent in any material respect, nor of any other deficiency in the claims. With respect to "sufficient divulgence", the district court expressly found the disclosure of the patent to be adequate and sufficient[1] (A-11).

The Court of Appeals, in affirming, quoted the particular language of the claims that defines the target angle computing instrumentalities of the patented instrument and said (A-23): "If any instrumentality in the M-2 computer is responsive to that clause, it is the part which calculates the target angle, which, as the trial judge found, considers empiric factors in addition to [those recited in the claim]." In the next sentence, it held that this clause of the claim was "ambiguous" in that it could read either on an instrument having structure that takes account *only* of the aiming dive angle at pickle or on one having structure that takes account of aiming dive angle at pickle *plus other factors.*

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[1]It is noteworthy that neither opinion below contains any suggestion that the claims are to be limited by reason of a file wrapper estoppel. While a defense of file wrapper estoppel was asserted, that defense was a most unusual one in that it was directed against validity. It was rejected by the trial court.

The court below resolved this "ambiguity" by condoning the trial court's limitation of the claims to no more than the precise embodiment of the invention that is revealed in the patent disclosure. On that basis it affirmed the holding of noninfringement upon the finding that the M-2 included something *in addition to* what was covered by the claims as so limited.

ARGUMENT

A.

In 1965-66, in *Graham v. John Deere Co.*, 383 U.S. 1, 86 S.Ct. 684 and its companion case, *United States v. Adams*, 383 U.S. 39, 86 S.Ct. 708, this Court turned its attention to the "unobviousness" requirement of 35 U.S.C., 103, which had been written into the Patent Codification Act of 1952 as an innovation in the statutory law of patents.

The present case presents questions concerning another provision of the Patent Codification Act that had no antecedents in the prior statutory law, namely the third sentence of 35 U.S.C., 112, which provides, insofar as here material:

> "An element in a claim for a combination may be expressed as a means * * * for performing a specific function without the recital of structure * * * in support thereof, and such claims shall be construed to cover the corresponding structure * * * described in the specification and equivalents thereof."

In the 17 years that this provision of Sec. 112 has been on the books, it has not received the gloss of this Court, although its importance in defining the substantive rights of patentees and the public needs no amplification. Special interest attaches to this Court's views upon it because of its relationship to *Halliburton Oil Well Cementing Co. v. Walker*, 329 U.S. 1, 67 S.Ct. 6, decided in 1946, about six years before enactment of the Patent Codification Act.

The claims in suit in the case at bar, which cover a new combination of individually old elements, are framed in accordance with the above-quoted provision of 35 U.S.C., 112. There was no substantial challenge to the

validity[1] of those claims. But in applying the claims, the courts below construed one element of each to cover only the corresponding structure described in the specification, refusing to accord to the claims a range of equivalents broad enough to encompass the accused device.

The Court of Appeals so restricted the scope of the claims on the basis of certain decisions of this Court (discussed hereinafter) that were handed down before passage of the Patent Codification Act of 1952.

At this point, even without a full understanding of the basis of the decision of the court below, it can be seen that there emerges from this case a question that can be broadly stated as follows:

> The third sentence of 35 U.S.C., 112 provides that an element of a claim that is drawn in the permitted form ("means" plus a statement of function) shall be construed to embrace not only the corresponding element disclosed in the patent but also "equivalents thereof." What determines the range of such equivalents?

B.

It is petitioner's position that in the present case the answer to this question is to be found in two well-established judicial rules of patent interpretation, which rules control here because of uncontradicted evidence in the record. Neither of those rules was mentioned in the opinion of the Court of Appeals. A brief discussion of those two rules in their application to this case will facilitate analysis of the decision of the court below and will

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[1] As noted above, there was a peculiar allegation of invalidity based on "file wrapper estoppel," but there was no evidence that would have supported any of the usual invalidity defenses of anticipation by prior art, lack of invention, indefiniteness or functionality.

better reveal how that court's decision poses other and more fundamental questions concerning 35 U.S.C., 112.

1. As long ago as 1889 this Court, in *Morley Sewing Machine Co. v. Lancaster,* 129 U.S. 263, 273, 9 S. Ct. 299, 302, said it was "well settled" that the inventor who first solves an important problem "is entitled to a liberal construction of the claims of his patent." More recently the rule that a pioneer patent is entitled to a broad construction has been followed, inter alia in: *Priebe & Sons Co. v. Hunt,* 188 F. (2d) 880, 882 (C.A. -8, 1951; cert. dism., 342 U.S. 801, 72 S.Ct. 92); *Corning Glass Works v. Anchor Hocking Glass Corp.,* 374 F. (2d) 473, 476 (C.A. -3, 1967; cert. den., 389 U.S. 826, 88 S.Ct. 65); *McCullough Tool Company v. Well Surveys, Inc.,* 343 F. (2d) 381, 401-402 (C.A. -10, 1965; cert. den. 86 S.Ct. 1061, 383 U.S. 933; reh. den., 385 U.S. 995, 87 S.Ct. 593) and *Plastic Contact Lens Company v. Butterfield,* 366 F. (2d) 338, 341 (C.A. -9, 1966; cert. den. 385 U.S. 1009, 87 S.Ct. 717.

Unless the third sentence of 35 U.S.C., 112 precludes its application here, that rule is clearly applicable to the case at bar, inasmuch as Mergenthaler could adduce no pertinent prior art against the patent in suit. By its nature this rule of patent construction is not so broadly applicable as many others, but — also by its nature — it is applicable precisely to the most meritorious class of patents, and therefore when applicable it should not be overlooked.

The evidence of the primary character of the invention in this case is so clear and forceful that it is most unlikely that the court below could have overlooked it. However, the Court of Appeals mentioned neither that evidence nor the rule that the claims of a pioneer patent are entitled

to a broad construction; but instead decided this case on the basis of a principle which it found in the pronouncements of this Court, as explained hereinafter.

It is the petitioner's position that the quantum by which the invention of a patent advances the art is one of the determinants of the range of equivalents to which the claims of the patent are entitled. A more specific aspect of the foregoing question can therefore be stated as follows:

> What weight (if any) is to be accorded to the most nearly pertinent prior art in determining the range of equivalents that should be accorded to a claim drawn in the style permitted by the third sentence of 35 U.S.C., 112?

2. In approaching the decision of this case the Court of Appeals found controlling significance in the differences between the accused M-2 instrument and the "best mode" embodiments of the invention that are disclosed in the patent in suit.[1] It found no significance in the fact that the claims in suit admittedly read squarely upon the M-2 (395a-396a), nor in the finding of the trial court (A-9, A-16) that the M-2, in one of its bombing modes, functions in the same manner as the instruments disclosed in the patent and achieves the same result.[2]

It is petitioner's position that the court below fell into error in this appraisal of what is significant and what is not significant in this case; and that the uncontroverted facts warrant application of the well-established rule that

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[1] The court below found so much significance in the differences between the M-2 and the illustrative instruments disclosed in the patent in suit that it mentioned in the very first sentence of its opinion (A-18) that the M-2 is covered by a patent issued to Mergenthaler.

[2] The Court of Appeals quoted this finding of the district court to indicate its approval (A-25—A-26), but made no comment upon it.

an accused device that otherwise adopts the claimed essentials of a patent does not escape infringement by adding improving features, even if such improving features are patentable in themselves, *Temco Electric Motor Co. v. Apco Mfg. Co.*, 275 U.S. 319, 328, 48 S.Ct. 170, 173 (1928); *Aluminum Co. of America v. Sperry Products, Inc.*, 285 F. (2d) 911, 923-924 (C.A. -6, 1960; cert. den., 368 U.S. 890, 82 S.Ct. 142); *Chicago Patent Corporation v. Genco, Inc.*, 124 F. (2d) 725, 730 (C.C.A. -7, 1941).

The approach taken by the Court of Appeals in this case, starting from the differences between the patented instrument and the accused M-2, thus raises another specific question concerning 35 U.S.C.; 112, which can be stated as follows:

> In determining the range of equivalents (i.e., the scope) to be accorded to a patent claim that is drafted in the "means" plus statement-of-function form permitted by 35 U.S.C., 112, should consideration be given to the differences between an accused device and the particular embodiment of the invention disclosed in the patent?

C.

It is now necessary to analyze the decision of the court below to fully bring out how it raises the last-stated question; and from that analysis it will further appear that the decision of the court below raises an additional and very fundamental question concerning the intent and purpose of 35 U.S.C., 112.

Only one element of each of the claims in suit was in issue. The findings of the district court establish beyond controversy that all of the other elements of the claims find their full response in the M-2.

..The Court of Appeals therefore focused its attention upon the controversial element, noting that it called for the computing instrument to have means for producing an output which is a function of the dive angle at pickle. It found that this recitation was "ambiguous" to the extent that it could cover an instrument having *only* such output means.

> "* * * The language of the claim is ambiguous as to whether it finds its response in an instrumentality such as the M-2 computer; it is susceptible to the literal interpretation that it reads *only* on instrumentalities which produce an output which is a function *only* of the aircraft's dive angle, as it was at the pickle point, and *not* on instrumentalities which consider other empiric factors also, and which do so after pickle." (A-24, emphasis supplied)

It is strongly and unmistakably implicit in this finding that the claims could also cover an instrument having the recited output means *plus others.* The court below thus found the claims "ambiguous" only insofar as they could be interpreted as containing either language of inclusion or language of exclusion.[1]

In passing, it might be observed that if this is ambiguity, then every patent claim is "ambiguous" in the same respect. It is also to be observed that the court below found this "ambiguity" in the element in issue of the claims because it did not apply the rule discussed above, that an accused device does not escape infringement by adding improving refinements to the claimed essential features of a patented invention.

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[1] In context, therefore, the finding that the claims are "ambiguous" is *not* a finding that they are indefinite. There is no finding of indefiniteness by either of the courts below, and the record refutes any suggestion of indefiniteness inasmuch as Mergenthaler's witness demonstrated his clear understanding of every element of every claim (379a - 385a).

To resolve the "ambiguity" that it thus found, the Court of Appeals went to the disclosure of the patent and found that the "best mode" instrument, in its target angle mechanism, contained *only* the means that the claims recite. And it held the claims to be limited accordingly, and therefore not infringed by an instrument that embodied the recited means plus others.

The Court of Appeals found its authority for this approach in decisions of this Court, and principally in *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 70 S.Ct. 854.

Graver, decided in 1950, was the last case in which this Court spoke on the general question of how to interpret a patent claim in determining the issue of infringement. In *Graver* it was held that the scope of a meritorious patent is not limited only to that which falls precisely within the language of its claims, but extends also to known functional equivalents of what the claims recite. This doctrine of equivalents was applied in holding that claims specifically reciting silicates of magnesium were infringed by welding fluxes containing silicates of manganese instead of silicates of magnesium. Mr. Justice Black and Mr. Justice Douglas dissented on the general ground that the claims of a patent are the sole measure of its grant.

Concerning the doctrine of equivalents, the majority opinion in *Graver* contains the following statement (339 U.S. p. 608-609, 70 S.Ct. p. 856) which the court below specifically cited (A-21, A-27) as setting forth the rationale upon which it decided this case (emphasis supplied):

> "The wholesome realism of this doctrine is not always applied in favor of a patentee but is sometimes used against him. Thus, *where a device is so far changed in principle from a patented article*

that it performs the same or a similar function in a substantially different way, but nevertheless falls within the literal words of the claim, *the doctrine of equivalents may be used to restrict the claim* and defeat the patentee's action for infringement."

The Court of Appeals recognized that this language suggests — even invites — limiting the literal terms of a claim by reference to the patent disclosure in any case where there is a certain degree of difference between the accused device and the patented article. The Court of Appeals characterized this principle as "the negative application of the doctrine of equivalents" (A-26).

It may be that the above quoted language from *Graver* was intended merely as dicta, stating a reason for the decision in the form of a summary of the doctrine of certain prior cases.

But the court below, in deciding the present case, did not read that language as dicta. It turned to the cases prior to *Graver* and read them in connection with the above-quoted statement. And the doctrine that emerges from those prior decisions, as to the circumstances in which the disclosure of a patent is to be used in limiting its claims, is *not* the doctrine that is set forth in *Graver*. Therefore the above quoted language from *Graver*, whether or not intended as dicta, seems to place the authority of this Court behind a rule of patent interpretation that extends substantially beyond the thrust of the prior decisions.

The only case cited in *Graver* in connection with the above quoted language is *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568, 18 S.Ct. 707, 722, decided in 1898. The court below quoted the cited passage in *Westinghouse* (A-26—A-27) and obviously intended to

follow its teaching as it found that teaching carried through *Graver*.

In *Westinghouse* the claim was couched in functional terms at the exact point of novelty. Instead of reciting structure, it claimed the new function that the invention performed. This Court saved the claim by limiting it to the specific structure shown and described in the patent disclosure, holding that the claim as so limited was not infringed by the accused device.

In the later (1946) case of *Halliburton Co. v. Walker*, 329 U.S. 1, 67 S.Ct. 6, a claim similarly functional was held invalid for failure to meet the statutory standard.[1] Had the *Westinghouse* claim come before the *Halliburton* court, it would undoubtedly have been held invalid, and the question of infringement would not have been reached.

Thus, contrary to what *Graver* seems to say, the starting point in *Westinghouse* was not in the differences between the patented article and the accused device, but in the deficiencies in the claim, and specifically in its functionality.

In this case the invention is in a combination. It is uncontroverted that the combination is new and ingenious. The elements comprising it had been known in several forms.

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[1] That the earlier Court was straining to save the *Westinghouse* claim is apparent from the following at 170 U.S., p. 562, 18 S.Ct., p. 718:

> "At the same time, as hereinafter observed, this liberality must be exercised in subordination to the general principle above stated: that the function of a machine cannot be patented, and, hence, that the fact that the defendant's machine performs the same function is not conclusive that it is an infringement."

The premise upon which the *Westinghouse* claim was held to be so limited as to be not infringed was the same one upon which the *Halliburton* claim was held invalid.

Petitioner submits, therefore, that the nature of this invention allows of its being claimed in the "means" plus statement-of-function format permitted by 35 U.S.C., 112. Neither the doctrine of *Halliburton* nor that of *Westinghouse* is applicable here, for there is no suggestion anywhere in the record or findings that the claims are functional.

But the court below found an implication in *Graver* that the rule of *Westinghouse* should be extended to embrace patent claims like those at bar. Furthermore, the court below relied upon another line of cases[1] subsequent to *Westinghouse* and prior to *Graver* for confirmation that it was correctly reading *Graver* as requiring the claims here in suit to be narrowly limited.

In those cases, insofar as they are here pertinent, patent claims were held to be limited, by reference to the disclosure, to something less than they covered by their literal terms. But, again, this was to save them from invalidity, and, specifically, to save them from the invalidating impact of prior art. In *Western States Mach. Co. v. S. S. Hepworth Co.*, 147 F. (2d) 345 (C.C.A.-2, 1945), for example, Judge Learned Hand said (p. 349):

> "It follows from what we have said that Carlson's patent left nothing on which Roberts could rely, except the fact that Roberts carried automaticity beyond the 'purging' and spraying periods, and included the drying period. * * * This does not mean that we must hold the claims invalid for all purposes. When a patentee has disclosed a meritorious invention, but has claimed it too broadly, he is not always forced to a reissue; courts will at times read into the broad language limitations drawn from the

[1] *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 61 S.Ct. 235; *Western States Mach. Co. v. S.S. Hepworth Co.*, 147 F. (2d) 345; *Carl Braun, Inc. v. Kendall-Lamar Corp.*, 116 F. (2d) 663.

> specifications, which save the claims as they stand. [Citing cases.]"

In this, as in *Westinghouse,* the disclosure of the patent was used to narrow its claims because the claims themselves were deficient in that they defined the invention too broadly.

Thus the test that emerges from the cases ahead of *Graver* starts with the claim; that which the court below found in *Graver* starts with a comparison between the accused device and the patented article. And, indeed, the decision itself in *Graver* tends to support the interpretation which the court below gave to the above quoted language in that case, for a comparison between the patented welding rod and the infringing device was the point of departure for the conclusion that the literal terms of the claim were not the sole determinant of infringement.

It follows that the statement in *Graver* upon which the court below relied, taken with the other cases that it relied upon, poses another question that relates to 35 U.S.C., 112 as it bears upon this case:

> Under what circumstances should valid patent claims that are drafted in the "means" plus statement-of-function format permitted by 35 U.S.C., 112 be limited by reference to the disclosure of the patent?

There is no authoritative answer to this question. In cases prior to *Graver,* claims were restricted to the specific structure disclosed in the patent when the claims were too broad, or when they were functional at the point of novelty. But are these the *only* circumstances in which a court can so limit the claims?

Graver seems to suggest that there *are* other circumstances in which the claims can be so limited, namely

when there is a certain degree of difference between the accused device and the patented article. And the court below expressly followed that apparent suggestion in *Graver*.

D.

Underlying this question posed by *Graver* and the cases preceding it is a question that involves a more fundamental interpretation of 35 U.S.C., 112.

The opinion of the Court of Appeals cites and quotes from *Westinghouse,* but does not cite *Halliburton.* Evidently the Court of Appeals read the third sentence of 35 U.S.C., 112 as overruling *Halliburton* and restoring the doctrine of *Westinghouse.* The enactment of that section as an innovative provision in the statutory patent law, coming only about six years after the *Halliburton* decision, may have been regarded as confirmation of that reading.

Furthermore, the court below evidently read the third sentence of 35 U.S.C., 112 as extending the *Westinghouse* rule to *every* claim drafted in the "means" plus statement-of-function format, even where, as here, the claim covers a new combination and is not functional at the point of novelty.

Viewing the third sentence of Sec. 112 as abrogating the doctrine of *Halliburton,* the requirement of the statute that the claim must be construed to cover "equivalents" of what is disclosed in the specification would then refer only to closely analogous mechanical equivalents to what is disclosed. Such a reading of 35 U.S.C., 112 would be consistent with the application of the statement in *Graver* that the court below relied upon.

It can be seen that it is necessary to know the basic meaning and purpose of the third sentence of 35 U.S.C., 112 in order to appraise the range of equivalents that it intends to accord to a claim drafted in the form that it provides for.

It is petitioner's position that the third sentence of 35 U.S.C., 112 was in nowise intended to abrogate the rule of *Halliburton,* but on the contrary, was intended to sanction only claims like those at bar, wherein old and known elements comprising a new combination are defined in terms of "means" plus a statement of function. Such claims had always been regarded as proper, *Buono v. Yankee Maid Dress Corporation,* 77 F. (2d) 274, 277 (C.C.A.-2, 1935), *Continental Paper Bag Co. v. Eastern Paper Bag Co.,* 210 U.S. 405, 28 S.Ct. 748 (1908). Petitioner therefore views the section as a codification of prior decision law. In that view, "The range of equivalents depends upon the extent and nature of the invention. If the invention is broad and primary in its character, the range of equivalents will be correspondingly broad * * *," *Continental Paper Bag Co. v. Eastern Paper Bag Co.,* supra, at 210 U.S., p. 414, 28 S.Ct., p. 749.

Stearns v. Tinker & Rasor, 252 F. (2d) 589, 596-598 (C.A. -9, 1958; cert. den., 350 U.S. 830, 76 S. Ct. 62) was decided after the enactment of the Patent Codification Act of 1952 and concerns a claim (claim 1) in the same form as those here in suit. The *Stearns* case was decided in accordance with the interpretation of Sec. 112 that petitioner regards as applicable here. There is a marked discord between it and the decision of the Second Circuit Court of Appeals in this case.

It is now apparent that in answering the above stated specific questions about the interpretation of 35 U.S.C.,

112 as it applies to this case, it is necessary to answer a much more fundamental and far-reaching question about that section, namely:

> Was the third sentence of 35 U.S.C., 112 intended to overturn *Halliburton* and restore the doctrine of *Westinghouse,* or was it intended to be consistent with *Halliburton* and to codify the judicial rules of claim interpretation that were established prior to its enactment?

E.

During the 17 years that the third sentence of 35 U.S.C., 112 has been in force, troublesome and very important questions have arisen about its meaning. This Court has made no pronouncement upon that section, and therefore those questions cannot be authoritatively resolved, although the answers affect very material substantive rights of patentees and the public.

Furthermore, this Court has not had occasion to consider a question of patent claim interpretation since *Graver,* which was decided prior to passage of the Patent Codification Act of 1952. Therefore this Court's prior decisions now afford little help in determining questions posed by the complex of *Halliburton,* 35 U.S.C., 112, *Graver,* and other cases on the interpretation of patent claims that are cited hereinabove.

The questions of claim interpretation that are raised by this case are highly important ones because they touch the heart of the issue of infringement[1] and thus control

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[1]The scanty help afforded by statutes other than 35 U.S.C., 112 is noteworthy. By 35 U.S.C., 271(a) a patent is declared to be infringed by one who makes, uses or sells the patented invention, but this obviously affords no test for determining when it is that a patented invention has been made, used or sold.

the scope of protection that a patent can actually be expected to afford.

Those questions are here presented in a case involving one of the few truly revolutionary patented inventions of our times, and which therefore concerns the most meritorious class of patents.

And those questions are presented in clear-cut form, not beclouded with side issues of limiting prior art, functionality or file wrapper estoppel, on a record containing express admissions that the literal terms of the claims in suit find complete response in the accused device.

CONCLUSION

It is respectfully submitted that certiorari should be granted to resolve the questions stated above.

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APPENDIX

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OPINION OF THE DISTRICT COURT

Plaintiff claims that its dive bombing computer, patent 2,609,729, has been infringed by defendant's M-2 computer, which is described in patent 3,132,561.

There is little question that the computer described in patent 2,609,729 and the claims of the plaintiff involve, in the language of section 101 of Title 35, "A new and useful . . . machine," which was invented and discovered by Wilkenson and Faxen.

Prior computers had serious drawbacks. They required a high angle of dive and releases of the bomb at relatively low altitudes while the target was in the sights of the pilot. A basic problem is that the bomb is influenced by gravity, so that at the moment of release the plane must be pointing over the target whenever the dive angle is less than 90 degrees.

The computer described in the patent in suit permits the pilot to point his plane towards the target over a wide spectrum of altitudes and dive angles, and then by pulling up from the dive to give the bomb sufficient forward momentum to hit the target. After release the combination of forward or forward and upward vectors carries the bomd forward while gravity pulls it down. As a result the pilot need not point his plane over the target, but he can point his plane at the target, actuate the computer and then pull up from the dive, leaving to the computer the problem of determining exactly when to release the bomb.

Toss bombing is analogous to firing a bomb by mortar. The force propelling it is not gun-powder in the barrel,

however, but the propelling force of an aircraft's motion in space as it "fires" the bomb. The problem of determining exactly when to release the bomb is complicated, because unlike a mortar, the aircraft can be in an almost infinite number of rapidly changing positions in height and range with respect to the target. It moves at a speed and in a direction, the initial momentum of the bomb, which is almost infinitely variable, and the aerodynamic limits on flight prevent the pilot from instaneously changing the direction of his aircraft. The plane in pulling up moves through an arc whose radius depends upon a variety of factors. The arc itself is not regular, because like a ship in the water, the plane responds to the direction controls somewhat sluggishly.

The vector analysis in aerodynamics in a fluid, air, with changing densities and currents, is complex. The variability of the ballistic qualities of the bomb compounds the problem.

The inventors of the patent in suit called upon their practical training as dive bombing aviators as well as considerable theoretical analysis of trigonometry, algebra, calculus and physics, and great engineering skill, to solve the problem. Their solution depends in large measure upon their judgment in omitting various theoretical complications that did not unduly affect accuracy.

It also depends upon simplified empirical equations that could be handled in a computer more easily than can the more complex mathematically complete equations.

In short the inventor of such a computer constructs a hypothetical situation simpler than the real world but close enough to it to permit his solutions to approximate reality. An analogy might be the Einstein formulas de-

scribing movement. At slow speeds they are not needed and simple Newtonian analysis is enough. At speeds approaching light, however, the more complex formulas must be used.

So too in computers one of the chief functions of the designer is to simplify and omit. A designer of computers for sixteen-inch guns on a battleship or for intercontinental missiles must take the rotation of the earth into account. A computer for a five-inch naval gun need not.

The highly successful and rugged computer of plaintiff depends to a considerable degree on the soundness of the practical choices made by its designers.

Based upon a reading of the exhibits and upon the testimony in this case, it seems quite clear that the patent is not void because it was obvious. In the language of Section 103 of Title 35, the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would not — and I insert the word not — have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Now, let me say a word about conceptions which I don't think are patented.

The toss bombing concept is not patented. It was well known before the Plaintiff's patent was applied for.

Nor was it possible to patent the process of obtaining the initial fix on the target through sighting means approximately parallel with the longitudinal axis of the aircraft. It would be obvious to anyone that the simplest method of fixing the relationship in space between the plane and the target would be by measuring from the

plane, first the angle between a line drawn to the horizon and one drawn to the target, and second, the altitude of the plane.

The first coordinate is easily obtained by the pilot actually pointing his plane at the target at the moment of the initial fix, or as referred to in the art, at the point of pickle.

A gyroscope will then measure the angle of the aircraft to the horizon.

Given these two facts, angle of dive and altitude, a 90 degree triangle can be constructed by an average high school student with the aircraft at the intersection of two lines and the target at the intersection of two lines. If the aircraft then remains in the same plane relative to the target — i.e. if it heads for a line drawn vertically up from the target into space — and the computer measures the aircraft's speed and direction, the relative position of the target and aircraft can be determined at any time.

Of course, I am not suggesting that the average high school student — even during these times when high school students are so well trained — could do any of these jobs beyond the solution of that simple triangle.

It is also clear that the fact that electronic rather than mechanical components are used in any computer is not decisive on the issue of infringement. Given the formulas and functions of a computer such as that described in Plaintiff's patent, a person skilled in the art, can, in most cases, substitute electronic for mechanical components.

In fact, Defendant's M-1 was primarily an electronic analog of Plaintiff's patented computer. Both the defendant and the United States recognized this and properly paid royalties on the M-1.

Now, let me address myself to the problem of a combination of elements.

Defendant contends that since the patent in suit describes a combination of elements and since the M-2 — the claimed infringing machine — omitted some of these elements, no infringement resulted. The cases cited by the defendant are not applicable to the situation before the Court.

For example, in Minnesota Mining & Manufacturing Company v. Permacel-Le Page's, Inc., 334 F2d 20, combination included a low molecular weight liquid in which molecular weight was uniform and specific, not average. The accused product was quite different in that its molecules had average weight.

In Hall-Mammoth Incubator Co. v. Teabouty there was a single claim for an incubator with 13 elements. The defendant omitted three elements. The Court noted that the defendant was not entitled to rely upon the "Doctrine of Equivalence" because the elements were "omitted altogether and nothing substituted therefore."

In the case of Hubbell v. United States, 1790, 5, 77, 80, the essence of the invention was the location of vents in fulminate of mercury caps.

The claimed infringing cartridges did not use vents in this position.

In the case before us, elements such as the pickle switch, gyroscope and the accelerometer were in plaintiff's computer but were omitted from the M-2. They were, however, intended to be supplied by other manufacturers.

The M-2 was designed to be used with these parts although they were to be outside the computer box. This

location is of no significance. As the expert witness for the defendant noted, one of the advantages of electronic analogs is that the computer can be broken up into many parts for placement in different parts of the plane.

Thus, the fact that inputs to the M-2 computer was supplied by instrumentalities outside the computer is not legally relevant in this case.

Now, let me speak for a moment about revelation.

There is a close question with respect to whether enough has been revealed in plaintiff's patent to permit a person skilled in the art to produce a computer which would work well. Section 112 of Title 35 requires that:

"The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same."

The ballistic cam — a central feature of the computer — the plaintiff's own evidence shows, must be machined differently from the way that the equations in the patent indicate in order to obtain a closer approximation to an accurate solution of the bomb tossing problem.

This is due to a variety of factors including the fact that the pullout curve is not exactly circular and that the angle between the plane and the target and the horizon changes between the point of pickle and the point at which the bomb is released.

The defendant required extensive data not in the patent to produce the M-1. Much of this data is incorporated in Plaintiff's Exhibit 21, which was supplied by plaintiff. Nevertheless, based on the testimony of Mr. Faxen, that

a person skilled in the art could make the necessary adjustments and, therefore, that a workable toss bomb computer could be manufactured based on divulgence in the patent, I find that the patent is not void for lack of divulgence.

Let me now address myself to the critical problem in the case. That is, the differences between plaintiff's and defendant's computer from the point of view of patent law.

The material in the "Caesar Modification" of Plaintiff's computer was designed at the request of the United States Government to permit a variable ballistic correction for different bombs and a variable aircraft centrifical acceleration. This is shown in Plaintiff's Exhibit 21 at page 43. While the plaintiff's testimony indicates that this modification could have been produced by a person having ordinary skill in the art, I find that it could not have been produced on the basis of information in the patent.

The patent, therefore, does not cover an instrument in which the target angle is constantly computed. I find that the patent is designed solely for dive bombing on the assumption that the pilot will pull out immediately after pickle in as sharp a maneuver as his plane and body will allow.

The defendant's M-2 was designed to do jobs that the M-1 and the computer described by the patent in suit even with the Caesar Modification could not do. It was designed to permit an air burst over rather than on the target; drops from increased heights in the M-1 altitude at time pickle was apparently limited to 20,000 feet; increased speed of aircraft; use of precise radar slant range

to the target: Variations in maneuver immediately after pickle; and various modes other than dive bombing. It permitted level bombing and over-the-shoulder bombing, techniques which used reference points other than sighting along the axis of the aircraft; employed the target as a reference point; and made use of a fixed known point from the target as a reference point in some bombing modes.

A number of these capabilities are obviously of use as speed and working altitudes of planes increase and as methods of defense become more effective through the use of such devices as ground to air missiles and more effective anti aircraft computers. In addition, some of this increased capability is obviously desirable where atomic bombs are used.

I credit the testimony of defendant's expert that when the defendant attempted to use plaintiff's formulas to design a computer with all these capabilities the formulas "fell apart" and new formulas had to be developed.

The M-2 is a more sophisticated instrument than the patent in suit and it does provide the advantages its designer sought for it. Whether modern military aircraft need all of these advantages is a matter this Court need not decide. In point of fact, the plaintiff's computer — as modified by considerable improvement — seems more successful economically than does the defendant's. The reason for this are not decisive. This issue has not, in fact, been litigated.

But I do find that the design of the defendant's was in good faith and was not simply intended to cover up a deliberate infringement. I recognize that whether deliberate or not, an infringement could exist even if the

defendant were not aware of the plaintiff's patent. Of course, in this case it was fully aware of that patent.

The reason that the M-2 has been able to meet the more complex requirements of its designers is that it constantly determines a changing target angle and ground range to target. It uses a different mathematical solution than does the plaintiff's patent. Defendant's solution is not based on the assumption that the plane will start a sharp pullout immediately after pickle.

The defendant's computer also uses different pragmatic shortcuts and different empiric data to make approximations to the theoretical equations it relies upon. These approximations and assumptions are necessary to produce accuracy without too great complexity. Based upon the exhibits and testimony of the witness for defendant — which I believe — that the equations and data supplied by the plaintiff for production of the M-1 did not assist defendant and was not used in the design and production of the M-2, I find that there was no infringement.

I also base that finding on all the other evidence in the case, some of which I already described.

It is true that when the ranging radar is not working on a plane equipped with the M-2 and the pilot begins a pullout immediately after pickle and when he maintains approximately the same centrifical acceleration, throughout his pullout, then putting aside speed and altitude limitations, he will go through identical steps and obtain about the same result whether he is using the M-2 or the computer described in the patent in suit. But the theoretical mathematics upon which the computer is basing its work and the empiric data built into the machine are not the same.

To the extent that the claims of the patent in suit are valid and to the extent that they are supported by sufficient divulgence, there is no infringement by the M-2. The exclusive rights granted to "make, use and sell" the invention, in patent number 2,609,729 were in no way violated or invaded by defendant. The defendant has not penetrated the limits which measure plaintiff's invention as covered in patent 2,609,729.

Judgment will be entered for defendant after I make findings of fact and law. Counsel will submit proposed findings of fact within ten days, and five additional days will be allowed for comments on the proposed findings submitted.

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FINDINGS OF FACT
and
CONCLUSIONS OF LAW

In accordance with Rule 52, the Court's oral findings of fact and law during the course of the trial are supplemented, in accordance with the requests of the parties, as follows:

Findings of Fact:

1. The M-2 instrument, referred to in paragraphs 7, 13, 14 and 15 of the Pretrial Stipulation, is shown and described in the Holland Patent 3,132,561 (Plaintiff's Exhibit 23 and Defendant's Exhibit Q), which is also owned by defendant.

2. The disclosure of Serial No. 731,163 was sufficiently complete to have warranted the issuance of a patent. Plaintiff was prosecuting that application forcefully and in good faith at the time the application for the patent in suit was filed. There is no indication that anyone suffered in any way because of the succession of applications.

3. A person skilled in the art could make a workable toss bomb computer based on divulgence in the patent in suit — patent 2,609,729. The patent is not void for lack of divulgence.

4. The computer described in the patent in suit and the claims of the plaintiff involve, in the language of section 101 of Title 35, "A new and useful . . . machine," which was invented and discovered by Wilkenson and Faxen.

Prior computers had serious drawbacks. They required a high angle of dive and releases of the bomb at relative-

ly low altitudes while the target was in the sights of the pilot.

The computer described in the patent in suit permits the pilot to point his plane towards the target over a wide spectrum of altitudes and dive angles, and then, by pulling up from the dive, to give the bomb sufficient forward momentum to hit the target. After release the combination of forward or forward and upward vectors carries the bomb forward while gravity pulls it down. As a result the pilot need not point his plane over the target, but he can point his plane at the target, actuate the computer, and then pull up from the dive, leaving to the computer the problem of determining exactly when to release the bomb.

The inventors of the patent in suit called upon their practical training as dive bombing aviators, their understanding of trigonometry, algebra, calculus and physics, and their engineer skill, to solve the problem.

Their solution depends in large measure upon their judgment in omitting various theoretical complications that do not unduly affect accuracy. It also depends upon simplified empirical equations that can be handled in a computer more easily than the more complex mathematically complete equations. The inventor of such a computer constructs a hypothetical situation simpler than the real world but close enough to it to permit his solutions to approximate reality. One of the chief functions of the designer is to simplify and omit. The highly successful and rugged computer of plaintiff depends to a considerable degree on the soundness of the practical choices made by its designers.

Based upon a reading of the exhibits and upon the testimony in this case, it seems quite clear that the patent

is not void because it was obvious. In the language of Section 103 of Title 35, the "differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would [not] have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

5. The toss bombing concept it not patented. It was well known before the Plaintiff's patent was applied for.

It was not possible for the inventors to patent the process of obtaining the initial fix on the target through sighting means approximately parallel with the longitudinal axis of the aircraft. It would be obvious to anyone that the simplest method of fixing the relationship in space between the plane and the target would be by measuring from the plane, first the angle between a line drawn to the horizon and one drawn to the target, and second, the altitude of the plane.

If the aircraft then remains in the same plane relative to the target — i.e. if it heads for a line drawn vertically up from the target into space — and the computer measures the aircraft's speed and direction, the relative position of the target and aircraft can be determined at any time.

It is also clear that the fact that electronic rather than mechanical components are used in any computer is not decisive on the issue of infringement. Given the formulas and functions of a computer such as that described in the patent in suit, a person skilled in the art, can, in most cases, substitute electronic for mechanical components. Defendant's M-1 was primarily an electronic analogue of Plaintiff's patented computer. Both the defendant and

the United States recognized this and properly paid royalties on the M-1.

6. Elements such as the pickle switch, gyroscope and the accelerometer were in plaintiff's computer but were omitted from the M-2. They were, however, intended to be supplied by other manufacturers.

The M-2 was designed to be used with these parts although they were to be outside the computer box. This location is of no significance. One of the advantages of an electronic analogue is that the computer can be broken up into many parts for placement in different parts of the plane. Thus, the fact that inputs to the M-2 computer were supplied by instrumentalities outside the computer is not significant.

7. The material in the "Caesar Modification" of Plaintiff's computer was designed at the request of the United States Government to permit a variable ballistic correction for different bombs and a variable aircraft centrifugal acceleration. This modification could not have been produced by a person having ordinary skill in the art on the basis of information in the patent.

The patent in suit does not cover an instrument in which the target angle is constantly computed. The patented instrument is designed solely for dive bombing on the assumption that the pilot will pull out immediately after pickle in as sharp a maneuver as his plane and body will allow.

The defendant's M-2 was designed with capacities that the M-1 and the computer described by the patent in suit, even with the Caesar Modification, lacked. It was designed to permit: an air burst over rather than on the target; drops from increased heights (in the M-1 altitude

at the time pickle was limited to 20,000 feet); increased speed of aircraft; use of precise radar slant range to the target; variations in maneuver immediately after pickle; and various modes other than dive bombing. It permitted level bombing and over-the-shoulder bombing — techniques which used reference points obtained other than by sighting along the axis of the aircraft; employed the target as a reference point; and made use of a fixed known point from the target as a reference point in some bombing modes.

A number of these increased capabilities are of use as speed and working altitudes of planes increase and as methods of defense become more effective through the use of such devices as ground to air missiles and more effective anti-aircraft computers. In addition, some of this increased capability is desirable where atomic bombs are used.

When the defendant attempted to use the plaintiff's formulas to design a computer with all these capabilities the formulas in the patent in suit proved unsatisfactory and new formulas had to be developed.

The M-2 is a more sophisticated instrument than the patent in suit and it does provide the advantages its designer sought for it.

The design of the defendant was in good faith and was not intended to cover up infringement.

The reasons that the M-2 has been able to meet the more complex requirements of its designers is that it constantly determines both a changing target angle and ground range to target. It uses a different mathematical solution than does the plaintiff's patent in suit. Defendant's solution is not based on the assumption that

the plane will start a sharp pullout immediately after pickle.

The defendant's computer also uses different pragmatic shortcuts and different empiric data to make approximations to the theoretical equations it relies upon. These approximations and assumptions are necessary to produce accuracy without too great complexity. The equations and data supplied by the plaintiff for production of the M-1 did not assist defendant and was not used in the design and production of the M-2.

When the ranging radar is not working on a plane equipped with the M-2 and the pilot begins a pullout immediately after pickle and when he maintains approximately the same centrifugal acceleration, throughout his pullout, then putting aside speed and altitude limitations, he will go through identical steps and obtain about the same result whether he is using the M-2 or the computer described in the patent in suit. But the theoretical mathematics upon which the computer is basing its work and the empiric data built into the machine are not the same.

Conclusions of Law:

1. The Court has jurisdiction of the subject matter and the parties to this action.

2. The patent in suit is entitled to the filing date of Serial No. 731,163, namely February 26, 1947, for all subject matter that it has in common with said 731,163.

3. To the extent that the claims of the patent in suit are valid and to the extent that they are supported by sufficient divulgence, there is no infringement by the M-2. The exclusive rights granted to "make, use and sell" the invention, in patent number 2,609,729 were in no way violated or invaded by defendant. The defendant has

not penetrated the limits which measure plaintiff's invention as covered in patent 2,609,729.

4. Defendant has renewed its Motion for Summary Judgment based on the question of estoppel raised in paragraph 12 of defendant's Answer. The legal question which arises is whether or not plaintiff is bound by and estopped from contesting the ruling by the U. S. Patent Office that plaintiff's abandoned U. S. application 731,163 failed to meet the requirements of R. S. 4888 (35 U.S.C. 112) regardless of the accuracy or inaccuracy of the Patent Office ruling. This motion by defendant is denied.

Dated: Brooklyn, New York
January 6, 1968

JACK B. WEINSTEIN
U.S.D.J.

OPINION OF THE COURT OF APPEALS FOR THE SECOND CIRCUIT

BONSAL, *District Judge*:

Svenska Aeroplan Aktiebolaget (SAAB), the plaintiff below, appeals from a judgment of the Eastern District of New York that SAAB's patent, No. 2,609,729 (patented September 9, 1952), was not infringed by defendant Mergenthaler Linotype Company's (Mergenthaler) M-2 computer, patent No. 3,132,561 (patented May 12, 1964). Mergenthaler cross-appeals from that part of the District Court's judgment finding SAAB's patent valid.

SAAB contends that in finding no infringement the District Court erroneously compared the computer disclosed in the specifications and drawings of the SAAB patent (the SAAB computer) with Mergenthaler's accused M-2 computer, instead of reading the claims of the SAAB patent upon the accused M-2 computer. In its cross-appeal, Mergenthaler contends that by application of the doctrine

of file-wrapper estoppel, the District Court should have found the SAAB patent invalid. For the reasons stated below, we affirm the judgment of the District Court.

Both the SAAB computer and the accused M-2 computer are used in aerial dive bombing by military aircraft. The earlier SAAB computer was used in the bombing technique called "toss bombing." Prior to the development of the SAAB computer, the pilot dove his aircraft at an angle to the target and when his sight indicated the proper altitude and position on his downward course, he released the bomb and immediately pulled out of the dive to avoid the bomb blast and defensive fire.

Utilizing the SAAB computer, the pilot dives his aircraft toward the target aiming at it through a sight along his normal axis of vision, which is essentially parallel to the aircraft's longitudinal axis. When the pilot has the target in his sight, he activates the computer by pushing the pickle switch (pickling). When activated, the computer commences to record the various factors necessary to determine when the bomb should be released. After pickling, the pilot pulls his aircraft out of the dive, and when the aircraft has reached the point in its pull-out which the computer has calculated to be the correct point at which to release the bomb, the computer automatically releases the bomb. For the computer to function properly, the pilot must pull out immediately after pickling, in the same plane as his dive and in a roughly circular path until the bomb is released.

The accused M-2 computer accomplishes the purposes above described with respect to the SAAB computer. However, in using the M-2 computer, the pilot is not limited in the toss-bombing technique to one type of pull-out. The M-2 computer permits the pilot to delay his pull-out after

pickling, and also permits him to make a pull-out shallower or deeper than the pull-out which is required by the SAAB computer, and it permits releasing the bomb so that it will explode as an airburst above the target. In addition to its greater flexibility in toss-bombing, the M-2 computer may also be utilized for various other tactics described in the trial judge's findings, below.

The significant difference between the SAAB computer and the M-2 computer is in the computation of the "angle of divergence" called Epsilon. Epsilon is basically the angle between a line drawn from the aircraft to the target, and a line corresponding to the aircraft's course direction, at that instant when the bomb would hit the target if it were released. Epsilon varies as a function of the aircraft's speed, altitude, and target angle (which is the angle with the horizontal created by the line from the aircraft to the target, mentioned above). The M-2 computer continuously monitors and computes all three of these primary factors to derive the value of Epsilon as the aircraft goes through its pull-out. The SAAB computer does *not* continuously monitor and compute a value for the target angle, but instead monitors the dive angle (which is the angle with the horizontal created by the line corresponding to the aircraft's course direction), which at the pickle point is the same as the target angle, and computes the target angle as a function of the dive angle at pickle point, calculating the function on the basis of an assumption built into the SAAB computer that the pilot will make the kind of pull-out described above. The trial judge found that:

> "The defendant's M-2 was designed with capacities that the M-1 and the computer described by the patent in suit, even with the Caesar modification, lacked. It was designed to permit: an air burst over rather than

on the target; drops from increased heights (in the M-1 altitude at the time pickle was limited to 20,000 feet); increased speed of aircraft; use of precise radar slant range to the target; variations in maneuver immediately after pickle; and various modes other than dive bombing. It permitted level bombing and over-the-shoulder bombing—techniques which used reference points obtained other than by sighting along the axis of the aircraft; employed the target as a reference point; and made use of a fixed known point from the target as a reference point in some bombing modes."

and he further found that:

"The reasons that the M-2 has been able to meet the more complex requirements of its designers is that it constantly determines both a changing target angle and ground range to target. It uses a different mathematical solution than does the plaintiff's patent in suit. Defendant's solution is not based on the assumption that the plane will start a sharp pull-out immediately after pickle."

These findings are supported by the record and are not clearly erroneous. F. R. Civ. P. 52(a).

It is to the claims of the patent in suit which one must look to determine whether there is infringement of SAAB's patent by Mergenthaler's M-2 computer. *Continental Paper Bag Co.* v. *Eastern Paper Bag Co.*, 210 U. S. 405 (1908); *Smith* v. *Snow*, 294 U. S. 1 (1935); *Graver Tank & Mfg. Co.* v. *Linde Air Products Co.*, 339 U. S. 605 (1950); *American Technical Machine Corp.* v. *Caparotta*, 339 F. 2d 557 (2d Cir. 1964), *cert. denied*, 382 U. S. 842 (1965); III *Walker on Patents* (Deller ed. 1937) 1681. SAAB contends that

the trial judge erroneously arrived at his holding of non-infringement by disregarding the claims of the patent in suit and their application to Mergenthaler's accused M-2 computer, and instead compared the M-2 with the illustrative computer disclosed in the specifications and drawings of the patent suit. However, a major part of the testimony at the trial was devoted to showing whether the claims of the patent in suit read or did not read upon the accused M-2 computer. A schematic block diagram of the M-2 was utilized to visualize testimony regarding the claims, and the trial judge indicated throughout the trial his awareness of this issue. In his opinion, he stated:

> "To the extent that the claims of the patent in suit are valid and to the extent that they are supported by sufficient divulgence, there is no infringement by the M-2."

Since the trial judge did consider the claims of the patent in suit in arriving at his decision, *Neff Instrument Corp.* v. *Cohu Electronics, Inc.*, 298 F. 2d 82 (9th Cir. 1961), is inapposite, for there counsel was not permitted by the trial judge to show that the claims of the patent in suit read on the accused device.

SAAB contends that the M-2 computer infringes or contributorily infringes claims 1, 2, 5, 6, 7, and 8 of its patent. These are combination claims; SAAB concedes that the individual elements of these claims are old, invention lying in the totality of the combination of these elements. The rule is clear that with regard to such combination claims, an accused device infringes only if each essential element of the combination claim finds its response in the accused device. *Aro Mfg. Co.* v. *Convertible Top Replacement Co.*, 365 U. S. 336 (1961); *Reiner* v. *I. Leon Co.*, 324 F. 2d 648

(2d Cir. 1963). Mergenthaler contends that the essential element in each of SAAB's claims which refers to an instrumentality for computing the target angle does not read upon the M-2, and that therefore there is no infringement.

Although differing in other regards, those parts of claims 2, 5, 6, 7, and 8 relating to that essential element do not differ materially from that part of claim 1, which reads:

> "instrumentalities for producing an output which is a function of . . . the angle between said axis of the aircraft and the horizontal at the instant the automatic functioning of the instrument is initiated by the actuation of said manually operable control means." *

If any instrumentality in the M-2 computer is responsive to that clause, it is that part which calculates the target angle, which, as the trial judge found, considers empiric factors in addition to the dive angle ("angle between said axis and the horizontal") at the pickle point ("the instant

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* Claim 2 incorporates claim 1 by reference, and the essential part of claim 7 is identical to the essential part of claim 1. The essential part of claim 5 reads:

> "instrumentalities for ascertaining the angle between said axis of the aircraft and the horizontal at the instant when said manually operable control means is actuated and for producing an output proportional to a function of that angle."

The essential part of claim 6 reads:

> "gyro means for effecting the other of said two movements of the cam in proportion to the dive angle of the aircraft at the instant actuation of the instrument is initiated."

The essential part of claim 8 reads:

> "gyroscope means for ascertaining the angle between said axis of the aircraft and the horizontal at the instant the automatic functioning of the instrument is initiated by the actuation of said manually operable control means and producing an output which is a function of said angle."

the automatic functioning of the instrument is initiated"), and also after the pickle point. The language of the claim is ambiguous as to whether it finds its response in an instrumentality such as the M-2 computer; it is susceptible to the literal interpretation that it reads only on instrumentalities which produce an output which is a function only of the aircraft's dive angle, as it was at the pickle point, and not on instrumentalities which consider other empiric factors also, and which do so after pickle. This analysis is equally applicable to the language of the other claims.

This merely verbal analysis is perhaps unconclusive; the trial court, however, was not restricted to the literal words of the claims, for the claims of the patent are to be read and interpreted in the light of its specifications and drawings. *Schriber-Schroth Co.* v. *Cleveland Trust Co.*, 311 U. S. 211 (1940); *Western States Mach. Co.* v. *S. S. Hepworth Co.*, 147 F. 2d 345 (2d Cir.), *cert. denied*, 325 U. S. 873 (1945); *Carl Braun, Inc.* v. *Kendall-Lamar Corp.*, 116 F. 2d 663 (2d Cir. 1941). *Graver Tank & Mfg. Co.* v. *Linde Air Products Co.*, 339 U. S. 605 (1950), is not to the contrary, holding only that under the doctrine of equivalents, an accused device may possibly infringe a patent even though it is not within the literal scope of the words of the claim. It does not speak to the issue of how the meaning of those words is to be derived.

The trial judge, after considering the claims as they were illuminated by the testimony, specifications, and drawings, made the following findings, in addition to those quoted above:

> "The patented instrument is designed solely for dive bombing on the assumption that the pilot will pull out

immediately after pickle in as sharp a maneuver as his plane and body will allow . . . .

A number of these increased capabilities are of use as speed and working altitudes of planes increase and as methods of defense become more effective through the use of such devices as ground to air missiles and more effective anti-aircraft computers. In addition, some of this increased capability is desirable where atomic bombs are used.

When the defendant attempted to use the plaintiff's formulas to design a computer with all these capabilities the formulas in the patent in suit proved unsatisfactory and new formulas had to be developed.

The M-2 is a more sophisticated instrument than the patent in suit and it does provide the advantages its designer sought for it.

The design of the defendant was in good faith and was not intended to cover up infringement . . .

The defendant's computer also uses different pragmatic shortcuts and different empiric data to make approximations to the theoretical equations it relies upon. These approximations and assumptions are necessary to produce accuracy without too great complexity. The equations and data supplied by the plaintiff for the production of the M-1 did not assist defendant and was not used in the design and production of the M-2.

When the ranging radar is not working on a plane equipped with the M-2 and the pilot begins a pullout immediately after pickle and when he maintains approximately the same centrifugal acceleration, throughout his pullout, then putting aside speed and altitude limitations, he will go through identical steps

and obtain about the same result whether he is using the M-2 or the computer described in the patent in suit. But the theoretical mathematics upon which the computer is basing its work and the empiric data built into the machine are not the same."

These findings are supported by the record and are not clearly erroneous. F. R. Civ. P. 52(a). The trial judge determined that "The patent in suit does not cover an instrument in which the target angle is constantly computed." Having so interpreted the claims of the patent in the light of the evidence before him, it is clear, although he did not specifically so state, that he then read those claims on the accused M-2 computer; in view of his finding that the M-2 computer does constantly compute the target angle, his conclusion that there was no infringement was clearly correct. *American Technical Machine Corp.* v. *Caparotta, supra,* is distinguishable on its facts, and there is here no evidence that the trial judge "limited the claims to a range of equivalency substantially defined by plaintiff's 'best mode,'" one of the grounds for reversal of a finding of no infringement in that case. Here, the trial judge read the claims, in the light of the evidence, on the accused M-2 computer and merely decided that whatever their scope, they did not read on the M-2.

Even assuming that the claims in the patent in suit did literally read on the M-2 computer, infringement would not be made out. The findings of the trial court dictate the negative application of the doctrine of equivalents, as in *Westinghouse* v. *Boyden Power Brake Co.,* 170 U. S. 537 (1898), where the court said:

"But even if it be conceded that the Boyden device corresponds with the letter of the Westinghouse

claims, that does not settle conclusively the question of infringement. We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided . . . . The converse is equally true. The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent." 170 U. S. at 568.

See *Graver Tank & Mfg. Co.* v. *Linde Air Products*, *supra*, at 608, 609.

The judgment of non-infringement is affirmed.*

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* Because of our disposition of the infringement issue, we do not consider the cross-appeal on the issue of the validity of SAAB's patent. *Wabash Corp.* v. *Ross Electric Corp.*, 187 F. 2d 577 (2d Cir.), *cert. denied*, 342 U. S. 820 (1951); *Harries* v. *Air King Products Co.*, 183 F. 2d 158 (2d Cir. 1950).